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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/415,540	10/08/1999	PHILLIP R. HAWKINS	PF-0148-3 CPA	4965

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EXAMINER	
SLOBODYANSKY, ELIZABETH	
ART UNIT	**PAPER NUMBER**
1652	

DATE MAILED: 01/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/415,540	HAWKINS ET AL.	
	Examin r	Art Unit	
	Elizabeth Slobodyansky	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspond nce addr ss --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 October 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *23-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *23-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

The amendment filed October 30, 2003 canceling claims 18-20 and adding claims 23-25 has been entered.

Claims 23-25 are pending.

Claim Objections

Claim 23 is objected to because of the following informalities: it appears that the recitation of "the polynucleotide sequence of SEQ ID NO:2" instead of "a polynucleotide sequence of SEQ ID NO:2" is appropriate.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 23, with dependent claims 24 and 25, is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that

the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 23 recites "a naturally occurring polynucleotide sequence at least 90% identical to a polynucleotide sequence of SEQ ID NO:2", thus encompassing all allelic variants of SEQ ID NO:2. There is no limitation on the function of a sequence that is 90% identical to SEQ ID NO:2. Thus, the genus of polynucleotides of claim 23 encodes proteins having pyrophosphatase activity and many variants thereof with unknown functions. This claim scope encompasses alleles of HPYP of SEQ ID NO:2 (i.e., HPYP variants that occur naturally within the human population); homologous HPYP genes from other species, provided they are at least 90% identical to HPYP; and other genes (e.g., other inorganic pyrophosphatase genes, from any species) that are at least 90% identical to HPYP.

Allelic variants are alternate forms of a gene which have at least one mutation in the nucleotide sequence which may result in mRNAs (polypeptides) with altered function. With regard to a naturally-occurring human polynucleotide sequence variant, there is no description of any mutational site that exist in nature, and there is no description of how the structure of SEQ ID NO:2 relates to the structure of any allele including strictly neutral alleles. The general knowledge in the art concerning alleles does not provide any indication of how the structure of one allele is representative of unknown alleles. The nature of alleles is that they are variant structures, and in the

present state of the art the structure of one does not provide guidance to the structure of others. Thus the claimed genus is highly variable with the potential to encode proteins with widely variant functions. The common attributes of the genus are not described. Therefore, one of skill in the art would not conclude that applicant was in possession of the claimed genus because a description of only one member of this genus is not representative of the variants of the naturally occurring genus and is insufficient to support the claims.

Claims 24 and 25 depend from claim 23 and are drawn to a method of use of a diverse genus of a probe comprising at least 60 contiguous nucleotides of a sequence complementary to a) SEQ ID NO: 2, b) a sequence 90% identical to SEQ OD NO:2, c) a polynucleotide complementary to a polynucleotide of a), d) a polynucleotide complementary to a polynucleotide of b) or an RNA equivalent of a)-d). The genus of said probes includes many structurally and functionally different species.

The specification discloses only a single species of the claimed genus, a probe consisting of a fragment of SEQ ID NO: 2 of at least 60 contiguous nucleotides of sequence of SEQ ID NO: 2. Moreover, the specification fails to describe any other representative species by any identifying characteristics or properties common to the entire genus of said nucleic acids and fails to provide any structure: function correlation present in all members of the claimed genus.

Therefore, based on the instant disclosure, in view of the level of knowledge and skill in the art, one skilled in the art would not recognize from the disclosure that the applicant was in possession of the genus of a polynucleotide probe comprising at least 60 nucleotides that are complementary to SEQ ID NO:2. Therefore, a naturally-occurring polynucleotide having 90% identity to SEQ ID NO: 2 and having an undisclosed function and a method of use of a polynucleotide probe comprising at least 60 contiguous nucleotides that are complementary to SEQ ID NO:2 lack sufficient written description needed to practice the invention of claims 23-25.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 23-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 23e) recites "an RNA equivalent of a)-d)" wherein a)-d) are drawn to a polynucleotide. An "RNA" is a polynucleotide not an equivalent thereof.

Claims 23-25 recite a sequence "complementary" to another sequence. The term "complementary" as defined in the specification may be "partial" or "complete" (page 7, lines 2-10) rendering the metes and bounds of the claims indefinite.

Claim 24 is confusing as reciting "60 contiguous nucleotides comprising a sequence complementary to SEQ ID NO:2" (emphasis added) because SEQ ID NO:2 has 1275 nucleotides. Amending the claim to recite "60 contiguous nucleotides of a sequence completely complementary to SEQ ID NO:2" would obviate this rejection.

Furthermore, claim 24 refers to a probe complementary to a complementary sequence. It is not defined whether the degree of complementarity is the same for each complementary sequence and if it is the same, the recitation of "complementary" appears to be redundant.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Yang et al.

Yang et al. (form PTO-1449, reference 2) teach cDNA encoding bovine pyrophosphatase. This sequence is more than 90% identical to SEQ ID NO:2 and comprises 60 contiguous nucleotides thereof. Therefore, the sequence of Yang et al.

anticipates claim 23. Yang et al. teach the use of the sequence as a probe to screen bovine, human and dog libraries (page 24646, left-hand column, and Fig.8). Therefore, the method of Yang et al. anticipates claims 24 and 25.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hillier et al. (A) or Hillier et al. (B).

Hillier et al. (A), (GenBank accession H50229, September 19, 1995, form PTO-892 mailed July 25, 2003) teach a human EST of 520 bp that comprises more than 200 contiguous nucleotides of SEQ ID NO:2. They teach that said EST is homologous to bovine inorganic pyrophosphatase.

Hillier et al. (B), (GenBank accession W67406, June 14, 1996, form PTO-892 mailed July 25, 2003) teach a human EST of 437 bp that comprises 436 contiguous

nucleotides of SEQ ID NO:2. They teach that said EST is homologous to bovine inorganic pyrophosphatase.

Each of these EST sequences comprises at least 60 contiguous nucleotides of SEQ ID NO:2.

Therefore, as knowledge of all the genes encoded by the human genome is important for understanding and/diagnosing human diseases or genetically determined drug interactions and for understanding many other human cellular processes, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use these cDNA fragments as hybridization probes for detecting a full-length target polynucleotide that specifically hybridizes thereto. Given the presence in a sample of SEQ ID NO:2 or a naturally-occurring polynucleotide having at least 90% sequence identity to the sequence of SEQ ID NO: 2", it will specifically hybridize with each of the ESTs taught by Hillier et al. (A) and Hillier et al. (B).

It would have been further obvious to one of ordinary skill in the art at the time the invention was made to amplify the target polynucleotide by PCR before hybridization as it is routinely performed in the art.

Response to Arguments

Applicant's arguments filed October 30, 2003 have been fully considered but they are not persuasive.

With regard to the written description rejection, Applicants argue that "the claimed variant polynucleotides are "naturally occurring" and as such, the scope of the claimed variants [in] is narrowed to a finite set, rather than all possible variants that could be produced using recombinant DNA techniques" (Remarks, page 4). It is agreed that the scope of "naturally occurring" variants is supposed to be more narrow than the scope of all possible variants. However, the specification fails to describe how a naturally occurring sequence is distinguished from a non-naturally-occurring sequence. While the specification describes a single representative of said naturally occurring variants, SEQ ID NO: 2, it fails to describe how its structure and function relate to the structure and function of other members of the genus of naturally-occurring sequences and how many of said variants exist in Nature. Applicants state that "the specification describes naturally occurring variants in several places" (page 4). As discussed above, only one variant is disclosed, that having the sequence of SEQ ID NO: 2. Applicants assert that " these descriptions underscore that the claimed polynucleotide variants are limited to "naturally occurring' polynucleotide variants and provide guidance as to what types of variants would be expected (page 4). This is not persuasive because the specification does not describe how the structure and function of other naturally occurring sequences relate to a polynucleotide of SEQ ID NO:2. Applicants further argue that the probes are described because "methods and software for designing DNA probes are well known in the art and are used routinely" (page 5). This is not persuasive because the genus of

said probes comprises not only fragments of SEQ ID NO:2 or a naturally occurring sequence that is least 90% identical to SEQ ID NO:2 but to fragments of the sequences that are complementary to each of the above sequences. Since the degree of complementarity is not defined, the genus of the probes comprises members with different structures and functions wherein the correlation between the structure and function common to all members is not disclosed.

With regard to the 103 rejection, Applicants argue that "these partial sequences [ESTs] were NOT identified as being a part of Applicants' claimed sequence of sequence of SEQ ID NO:1, which had not yet been elucidated – fact, the claimed sequence has been found allowable by the Examiner. What might have been obvious is the wish to know the full sequence that corresponded to some extent to the ESTs identified by the cited art, but none of the art of record discloses these sequences. applicants do not claim a method for detecting all HPYPs. Applicants claim a method for detecting **the** HPYP of SEQ ID NO:1. The Examiner improperly construes the claimed language by failing to give weight to the limitation of the preamble "said target polynucleotide having the sequence of a polynucleotide of claim 19 [23]". These arguments are not found to be persuasive because the claim preamble must be read in the context of the entire claim. In that respect the method steps are the same whether a method for detecting all HPYPs or a method for detecting **the** HPYP of SEQ ID NO:1 is claimed. In other words, the preamble does not limit the claimed method itself but

merely states the purpose or intended use of the invention, rather than provides any distinct definition of any of the claimed invention's limitations. Therefore, the preamble in the instant case is not considered a limitation and is of no significance to claim construction (MPEP 2111.02).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Slobodyansky whose telephone number is (571) 272-0941. The examiner can normally be reached Monday through Friday from 10:00 AM to 6:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Ponnathapura Achutamurthy, can be reached at (571) 272-0928. The FAX phone number for Technology Center 1600 is (703) 308-4242.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Center receptionist whose telephone number is (703) 308-0196.

E. Slobodyansky

Elizabeth Slobodyansky, PhD
Primary Examiner

January 20, 2004